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Thesis

# SECURING 100% ACCURACY IN THE FUNDAMENTALS OF ARITHMETIC

Submitted by

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Fundamentals of Arithmetic

## Outline

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In September, 1928, the writer took up the duties of supervising principal of the Washington School, Millburn, New Jersey. This small city is one of the suburbs of Newark and is increasing in population very rapidly, nearly doubling every ten years. It is a community of commuters, most of whom are fairly well off as far as possession of worldly goods is concerned, alert, exceptionally intelligent, and vitally interested in the welfare of their children.

Millburn includes the communities of Short Hills, Wyoming, Millburn Center, and the Ridge Section, each of which has its own elementary school. A Parent-Teacher Association, in the past particularly active and militant, and responsible for many changes for the better, functions in each district, and by means of representatives, for the whole city. The interest of the parents in the welfare of their children is well demonstrated by the success attending the establishment of two Child Study Groups meeting twice a month, this past year. There were over 150 members in the class studying Adolescent Children and only slightly fewer, (137 to be exact) in the class studying the Pre-Adolescent Children. In such a community one could expect considerable support in carrying out any educational program that the parent could interpret as an advance over the past program. It did not require a great deal of effort to convince these parents that the program of 100% Accuracy in the Fundamentals of Arithmetic was sound and that its in-

troduction into the schools of Millburn would be a point of progress.

In school matters, however, one has to deal not only with parents, but with his superiors and with his equals, the teachers. New Jersey possesses one of the most active and effective Teachers Associations in the country. Few communities or school officers act without regard to this group. The superintendent occupies a very responsible position. Because of the wealth of the community, funds for school purposes are almost unlimited. The superintendent can get by action of his board whatever he can convince them is or will be advantageous to the system. His position is even better than that. They will support him in whatever they feel that he has given careful and thorough consideration, but he is not expected to make mistakes. For which reason our superintendent in Millburn is open to conviction on ways and methods of progress in the educational field but he has to be convinced that his principals have given the matter as careful and thorough consideration as he himself will be called upon to do. The writer drew freely on Dewey, Wilson, Wise, Charters, Osburn, Myers, and others for evidence to present that a change was needed and for indications as to what changes to make. This was followed by making a comparative study of the many diagnostic and survey tests now in use in the field of arithmetic. The principals of the elementary schools, junior and senior high schools and the superintendent met weekly in meetings lasting from one to three and a half hours. By January, 1929, it had been agreed that nothing less than 100% Accuracy was desirable, and that the Wilson Diagnostic Tests and Drill Ser-

vices would be used from February on. It might be mentioned that one of the greatest drawbacks to the adoption of this material was the fact that only the drill service in addition was available. The program calls for the use of the drill services in all of the operations, beginning September 1929, and the publishers of the material fail to assure us that they will have it available at that time. Dr. Wilson has consented to our using mimeographed material until the services are ready so that our work should not be retarded.

Not only should one have the support of the community, and the approval of his superiors, but he must have the cooperation of his teachers. The superintendent of schools in Millburn has always selected his teachers with great care. The teacher must have several years of successful experience before entering the system. It has been the policy of the school head to gather his teachers from many rather than from a single state. The result of this is that the teachers in the system have had varied experiences, varied training, and are valuable to each other in the exhange of ideas. They have their own points of view regarding Parent-Teacher Associations, use of tests, etc., favorable or unfavorable, as their experiences were pleasurable or otherwise. Strange as it may seem, nearly every teacher was somehwat antagonistic to the use of tests as aids to teaching or for survey purposes. Apparently the unwise use of standard subject tests and group mental tests is very widespread. To break down this attitude became the first and foremost duty of the principal and the first half of

the school year was devoted to this purpose. T he method pursued was individual consultation with each teacher regarding her problem cases and the requiring of definite statements as to difficulty and source of difficulty. Usually these were not forthcoming from the teacher, and a large number of diagnostic tests were studied by principal and teacher to determine which one in their opinion would best locate the seat of trouble. Such tests would then be given to the individual pupil, carefully diagnosed, and specific remedies applied. By the time this had been done for two or three pupils for each teacher, the latter were "making dates" with the principal for so many investigations that he felt the time was ripe to suggest using the tests on the entire classes. Eight of the seventeen teachers in this one building took extension courses on "Tests and Measurements" the second half-year and there were several other teachers in the system doing the same thing. The local Parent-Teachers' Association was at this time making a great effort to arouse sufficient concerted action to do away with the Teacher Tenure Law. It therefore became necessary to assure and demonstrate to the teachers that the class medians obtained on the tests used, would not be used for the purpose of "locating the 'poor' teacher", nor as a "measure of her efficiency". The inadequacy of the tests for such a purpose was clearly demonstrated to them and yet it was quite amusing to see these same teachers accept for such, all of the good reports these tests offered. Fear of tests was removed and an understanding of their use acquired as a result of the half-year's wait that might never have been achieved had the tests been unceremoniously shot at the

teachers. Whenever a teacher doubted the results shown by a standard or mental test, the same was repeated using a different form or in some cases another test, regardless of time and expense, and the sureness with which the same relative ratings were obtained, was usually the clinching of the argument.

Next in order was the securing of the interest of the pupils in the proposed use of tests and the attempt to secure 100% Accuracy in the Fundamentals of Arithmetic. The school lacked just one pupil of Italian extraction in order to be 50% Italian. This was not the case in the other elementary schools in the city. Being "foreigners", the children in this building were "not expected" to do as good work as in the buildings having a higher social class to draw from. The pupils were well aware of this fact. Many of the 51% would have preferred being in another building. Several children in the other buildings belonged in this one by residence classification. It might be apropos that I note that it was in New Jersey that the statement was made to me that "they ought not to be educated anyway. The first thing you know they will be having all of the jobs and running the country". By means of talks in the daily assemblies, a fine morale was built up among the pupils. Principal and teachers combined in instilling in the minds of the pupils that they, the principal and teachers, had confidence in the abilities and will-to-do of the student body. Results of standard tests during the second half-year were announced in the assembly. The school as a whole was never lowest and very, very frequently particular classes would be the highest ranking class on that particular

teachers. Whenever a teacher doubted the results shown by a standard or mental test, the same was repeated using a different form or in some cases another test, regardless of time and expense, and the sureness with which the same relative ratings were obtained, was usually the clinching of the argument.

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test in the city. At the same time the real purpose of testing was disclosed to the pupil. They relished tests because the latter were not for the purpose of "marking", but to find out what the pupil had difficulty with, and thus give the teacher opportunity to give him needed help. In nearly every class there existed a group which came in before school, or remained after hours, for the purpose of drilling on material the tests had disclosed that they were weak in. When one considers that these groups were voluntary and that the teacher participated only if requested, one has to admit that the pupils were meeting the situation at least half way. An interesting result was the "transfer" of several pupils back to this building on request of the parent or pupil.

In order to understand the whole situation one should know of the organization of the system as a whole. There were four elementary schools, the Washington, Short Hills, Wyoming, and Lincoln. The first three were thoroughly equipped, kindergarten through grade six, the Lincoln was a rural school, grades one to four. The three larger buildings offered manual training and sewing, art, music, physical education, all with special supervisors. Short Hills and Wyoming offered French in grade five, Washington maintained a Special Class for Defectives and had semi-annual promotions, the latter supposed to be a boon to a school of its type. Semi-annual promotions existed nowhere else in the system. Topping the elementary schools is a Junior-Senior High School with total enrollment slightly under that of the Washington School. Ground is being broken this summer for a $650,000 addition to this building. It is evident that the organization

of the Washington School within the system as of September, 1928, placed this school in more or less the position of an outcast.

Before introducing the Wilson 100% Accuracy in Fundamentals into the system and particularly into the Washington School, it was felt desirable to have some definite knowledge regarding pupil placement or retardation. Of like value would be a mental survey of the school. The first thing done was to prepare an age-grade table for the building. The table accompanies this report. It discloses a situation of 25.4% of the pupils in this building as being one or more years retarded. The causes of this condition were carefully considered and a special report, relative to this situation is appended. The same report naturally required a mental survey and the conditions relative to that. The inter-relations of the two, together with the influence of foreign parentage is all dealt with in the appended report.

Inasmuch as a new scheme in handling the subject of arithmetic was to be instituted, it is wholly logical to discuss the situation relative to that subject as it existed in the city prior to September, 1928. Roughly, it was as follows. In grade one pupils learned to count, read and write numbers, and learned the "45 addition and subtraction combinations". These processes were completed in grade two, multiplication and short division in grade three, long division in grade four, common and decimal fractions in grade five and percentage in grade six. Hamilton's Arithmetic was in use up to September, 1928. A new text was then introduced but the old course of study was not revised and Hamil-

ton had exerted a great influence on the teachers. The new text had been adopted prior to the new principal taking office, so that he had nothing to say regarding its selection. However, if the new point of view could be gotten across to the teachers successfully, the text-book could be adequately cared for. Having secured the needed cooperation all along the line, as previously explained, it was now necessary to be able to answer the teachers' query of "What Shall We Teach in Arithmetic?"

In the kindergarten was the place to begin a consideration of the subject. A study of the group demonstrated that many of the children therein needed and had acquired the ability to count to ten. They all had a good concept of "one", "two", some even higher, and "five" and "ten", particularly in relation to money and fingers, was quite common. It was felt that it would be to their advantage if the pupils went on to grade one with a definite set of concepts, so it became the kindergartners duty to see that all the children had occasion to use in their activities, concepts of "one", "two", "four", "five", "ten", and could count ten objects, or any number less than ten. There it was left and to be developed only if a situation arose making it necessary and then only carried far enough to solve the present difficulty. It is extremely doubtful whether an untrained observer would have been at all aware that this work was going on in the kindergarten.

In grade one, children learned to count to 100, and read and write numbers through the last page in any book used in their reading. There was no formal drill at all. Arranged across

the room above the blackboard were cards with all of the simple combinations including the sum. It was only necessary to find the proper combination to get the correct answer. The children unconsciously counted in nearly all of their addition work in the upper grades. According to Osburn's investigation this might have been traced to early experiences with sums arrived at in that way. This has been overcome by removing the necessity for counting in order to get a sum. But little time will be devoted thereto however, most of it being spent in acquainting the pupil with arithmetical situations wholly within his comprehension. In grade one this past year all of the early reading material was developed by the pupils in class. It was interesting to note the number situations which later were incorporated into simple problems as a part of their reading matter. All number situations were real to the children and vital to them. The unit of work for this class covering one half-year was called "Learning to Read". The second half-year number concepts were developed through games involving counting mostly, including counting by 2's through 32 (number of pupils in class) and by 5's to 50 and 10's to 100. The children had concepts of "How many", "How many more", "How much", and had experienced the situations involving addition and subtraction as processes, but not consciously being aware of addition and subtraction, as such. Simple reading problems provided many situations and it is doubtful in this case as with the kindergarten whether an observer would realize that certain situations in the reading lesson or in their play, were being made use of by the teacher as opportunities for fur-

thering number concepts.

The attempt was also made in grade two to have no formal lessons in arithmetic. The work was organized around a 5 and 10 cent store project and sums for all combinations needed were displayed on cards as in grade one. In grade one, however, the teacher was primarily concerned in teaching the children to read and therefore not at all averse to concentrating her attention on that subject. The teachers in grade two, having previously taught considerable "number work" in that grade, were continually dropping back to formal work, with examples on the board for the children to solve. It was with considerable difficulty that this was kept at a minimum. It was not due to a lack of cooperation on the part of these teachers, but mainly due to habit, a consciousness of what was generally felt that the pupils "needed", and an awareness of the enjoyment of the pupil in doing that work. It is now felt that the consequences of the errors made by these children is so enduring and interferes so greatly in getting accurate results in the higher grades because of the tendency to repeat errors, that these teachers will be more thorough in avoiding opportunities for such and keener in devising and applying games, etc., involving number situations, and thus make our second grade work for next year an improvement over that of this past year.

The informational unit of work, lasting throughout the year, for grade three, was the grocery store. The pupils had built a row of shelves and painted them, then stocked them with grocery cartons, bottles, etc. All were labeled clearly. Two telephones were provided and one pupil would be storekeeper while one was a customer. The lat-

ter would phone in an order, discuss the matter of price of each article, complete the order and ask the storekeeper for the sum. All pupils participated, listening to the order and writing the sums down. As soon as the total (or as frequently happened, the change due) was requested, they would all set themselves to the task (?). This is really a very inappropriate term as anyone observing the group would agree. Situations involving addition, subtraction, multiplication, division, and common and decimal fractions (as used in dollars and cents) arose and as two twenty minute periods were devoted weekly to this activity, the pupils were thoroughly familiar with the various situations. This provided a motivation for the formal drill that was provided. No situations were created by the teacher to carry the work beyond the limits which the pupils themselves placed upon it. The common units of linear, liquid, dry, and weight measure were available and utilized. No tables were learned however.

Arithmetic as a formal subject was introduced in grade three as has just been noted. The teachers having agreed to Dr. Wilson's proposition, felt that they would like to attempt the 100% Accuracy program. It looked so good that it was decided to get a sufficient quantity of the Drill Service for Addition to care for grade four as well. This was done and the program was to secure 100% Accuracy in the Fundamentals of Arithmetic in the Addition Process, complete subtraction, and in grade four, complete multiplication and short division, as well. Grade five was to carry on long division, decimals and common fractions, and grade six such special processes as were desirable.

During the first half-year no pupil in grades three or four had had the training instituted for grades one and two in September, 1928. Beginning February, 1929, however, 3B constituted a class having had experiences as cited above for one half-year. A problem test on third grade material, given to grades three, four, five and six in May, disclosed the fact that grade three was superior to the entire group on this material. This was decidedly important and justifies fully the developing of real life experiences solved by arithmetical processes before formal work is given in those processes.

It would be very interesting to observe the results of the Wilson Survey Tests (3P) prior to the beginning of his program. The tests were given throughout the system, grades three through six and gave the following results.

Results of First Presentation of General

Survey Test, February 5, 1929

| | Pupils | 100 | 90-99 | 80-89 | 70-79 | 60-69 | 50-59 | 40-49 | 30-39 | 20-29 | 10-19 | 0-9 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $III_1$ | 39 | 0 | 1 | 3 | 5 | 2 | 8 | 15 | 0 | 2 | 2 | 1 |
| $III_2$ | 30 | 0 | 0 | 1 | 2 | 5 | 9 | 8 | 3 | 1 | 1 | 0 |
| $III_3$ | 32 | 0 | 0 | 2 | 4 | 2 | 12 | 9 | 0 | 2 | 1 | 0 |
| $III_4$ | 34 | 0 | 0 | 2 | 3 | 6 | 11 | 11 | 0 | 1 | 0 | 0 |
| $III_5$ | 37 | 0 | 1 | 2 | 6 | 5 | 10 | 8 | 1 | 0 | 1 | 3 |
| | 172 | 0 | 2 | 10 | 20 | 20 | 50 | 51 | 4 | 6 | 5 | 4 |
| | Median 52.88 | | | | | | | | | | | |
| | | | | | 73.47 | | | | | | | |
| $IV_1$ | 28 | 0 | 1 | 8 | 13 | 4 | 1 | 0 | 0 | 1 | 0 | 0 |
| | | | | | 72.88 | | | | | | | |
| $IV_2$ | 36 | 0 | 2 | 10 | 16 | 5 | 2 | 1 | 0 | 0 | 0 | 0 |
| | | | | | 73.22 | | | | | | | |
| $IV_3$ | 34 | 0 | 1 | 11 | 14 | 4 | 1 | 1 | 1 | 1 | 0 | 0 |
| | | | | | 73.86 | | | | | | | |
| $IV_4$ | 31 | 0 | 3 | 6 | 14 | 4 | 2 | 1 | 1 | 0 | 0 | 0 |
| | | | | | 73.22 | | | | | | | |
| $IV_5$ | 38 | 0 | 2 | 12 | 14 | 6 | 2 | 1 | 0 | 1 | 0 | 0 |
| | 167 | 0 | 9 | 47 | 71 | 23 | 8 | 4 | 2 | 3 | 0 | 0 |
| | Median 73.43 | | | | | | | | | | | |

Results of First Presentation of General

Survey Test, February 5, 1929

| Pupils | 100 | 90-99 | 80-89 | 70-79 | 60-69 | 50-59 | 40-49 | 30-39 | 20-29 | 10-19 | 0-9 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| III$_1$ | 39 | 0 | 1 | 3 | 5 | 8 | 13 | 0 | 5 | 5 | 1 |
| III$_2$ | 30 | 0 | 0 | 1 | 5 | 9 | 8 | 3 | 1 | 1 | 0 |
| III$_3$ | 32 | 0 | 0 | 3 | 4 | 5 | 12 | 0 | 2 | 1 | 0 |
| III$_4$ | 34 | 0 | 0 | 3 | 3 | 6 | 11 | 0 | 1 | 0 | 0 |
| III$_5$ | 37 | 0 | 1 | 3 | 6 | 5 | 10 | 1 | 0 | 1 | 3 |
| | 172 | 0 | 2 | 10 | 20 | 20 | 30 | 4 | 8 | 8 | 4 |

Median 82.88

73.47

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| IV$_1$ | 28 | 0 | 1 | 8 | 13 | 4 | 1 | 0 | 1 | 0 | 0 |

72.82

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| IV$_2$ | 36 | 0 | 3 | 10 | 16 | 3 | 3 | 1 | 0 | 0 | 0 |

73.26

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| IV$_3$ | 34 | 0 | 1 | 11 | 14 | 4 | 1 | 1 | 1 | 0 | 0 |

73.85

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| IV$_4$ | 31 | 0 | 3 | 8 | 14 | 4 | 3 | 1 | 1 | 0 | 0 |

73.20

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| IV$_5$ | 38 | 0 | 3 | 12 | 14 | 6 | 3 | 1 | 0 | 1 | 0 |
| | 167 | 0 | 9 | 47 | 71 | 23 | 8 | 4 | 2 | 3 | 0 |

Median 73.45

The following points were the important ones. First, not a single pupil in either the third or fourth grade secured 100%. On looking over the papers, the reason was very evident. Certain number combinations had never been taught. This seemed very certain when those same combinations proved to be the most unlearned in grades five and six. The word "unlearned" is used where one might have written "difficult", but experiment has demonstrated that these combinations, namely, the "0" ones, are really very simple but most frequently omitted in the teaching process. Second, these tables show a range from 0 to 99 in grade three, and from 20 to 99 in grade four. The median in grade three is 52.88 and grade four improves the situation by raising this median to above "passing" mark, to what has been considered evidence of satisfactory progress, 73.43. Classes were not grouped on the basis of intelligence, and held practically the same enrollment and personnel throughout the year. Next year, class groups will be on an intelligence quotient basis, and it is expected that even greater success will attend our efforts, than for this past year. 100% Accuracy for all divisions of all classes will still be the goal.

The procedure followed in all ten classes of grades three and four were practically the same. All ten teachers were given the same teaching material, the same suggestions and the same encouragement. A description of the work as carried on in a third grade ($III_1$) will give an idea of how it was done, possibly pointing out some weak spot where another investigator may help us. Pupils were provided with Wilson's Drill Service for Securing 100% Accuracy in Addition. T he first five primary combinations in Group 1 were placed on the board, with answers present. These were then read orally, by individuals and in

unison, then copied by the pupils. The order in reading was varied. Sums were then erased one by one, and the same procedure again followed. To avoid learning a series of answers regardless of the example particular pains were taken to avoid retaining a given order. Flash-cards were made and used for quick drill. In this connection, it was evident that many children had been harmed by formal arithmetic work in grades one and two. With particular pupils it was possible to secure 100% accuracy with the flash-cards in a comparatively short time, but when confronted with the same combinations, as examples, these pupils would revert to counting and invariably made errors. It is perfectly true that these pupils did better and quicker work when a teacher stood over them and so "disturbed" them that they couldn't count. Perhaps, not pedagogical in its best sense, but true in these particular situations. As soon as every member of the class had demonstrated 100% efficiency in the primary combinations of group one, section two, the decade drill was taken up and the same procedure followed, except at the end when the pupils were allowed to write the answers in their booklet. Sometimes but one section would be covered per day, but usually it was more. By May sixth every pupil in every class had experienced the above drills, completing the booklet as far as the further drill exercises on page 33.

The procedure now was the administering of the inventory tests, 3A, 3B, 3C and 3D. Every pupil scored 100% on 3A and 3B at his first try. 3C located a few individuals who apparently had lost some specific teaching because of absence. The procedure then was as follows. Bob, having failed on the combination 28 + 9 = turned back to Group 7 in his booklet as this group contained the 8-9 com-

binations and worked on section two, the group decade drill, until he could not be tripped by Phil, who, having secured 100% on Test 3C had been assigned as his "tutor". Test 3D was then given and such difficulties as were noted, checked in the same manner. Every pupil now felt himself ready for the "P" tests and the teachers felt likewise. So the "3P" tests were given for the first time on May fourteenth. Following is the record of the poorest class.

| 100 | 91-99 | 81-90 | 71-80 | 61-70 | 51-80 | 41-50 |
|---|---|---|---|---|---|---|
| 2 | 2 | 8 | 8 | 5 | 1 | 1 |

Not one of the ten classes involved had secured 100% for 100% of its pupils. Pupils and teachers were discouraged. In some cases, the combination failed in the "P" test had not been failed on by the pupil previously. An assembly of grades three and four was held and the principal talked to pupils and teachers about the "P" tests. Its purpose was to point out difficulties not previously located. Pupils and teachers and principals worked on the analysis of errors. It was suggested that giving the incorrect answer to an example previously solved correctly was due to having "learned" an incorrect answer in earlier years and its repetition was a demonstration of the persistency of errors. The pupil should, therefore, recognize that situation as one on which he might err unless he exercises especial care. Then to cheer up everyone attention was called to the great change in the class medians. The lowest median, that of a third grade was 79.875 with a range from 41 to 100, a decided improvement over the best that any of the five fourth grades had been able to do in February, the highest then being 73.86 with a range from 30 to 99. It was decided unanimously to "carry on" and every-

one went to work with a will. June tenth was set as our big day when all third and fourth grades would again take "3P". No more class time was devoted to arithmetic than the regular program called for. It has to be admitted, however, that the interest of the pupils was such that "free" periods, recesses, and self-imposed homework was 99% arithmetic. The following table, showing the results of the "3P" tests given on June tenth, speak for themselves.

| | Pupils | 100% | 90-99 | 80-89 | 70-79 | 60-69 | 50-59 | 40-49 |
|---|---|---|---|---|---|---|---|---|
| $III_1$ | 38 | 38 | 0 | 0 | 0 | 0 | 0 | 0 |
| $III_2$ | 27 | 2 | 2 | 8 | 8 | 5 | 1 | 1 |
| $III_3$ | 32 | 30 | 1 | 1 | 0 | 0 | 0 | 0 |
| $III_4$ | 36 | 32 | 3 | 0 | 1 | 0 | 0 | 0 |
| $III_5$ | 36 | 36 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 169 | 138 | 6 | 9 | 9 | 5 | 1 | 1 |
| $IV_1$ | 28 | 28 | 0 | 0 | 0 | 0 | 0 | 0 |
| $IV_2$ | 34 | 29 | 2 | 1 | 0 | 1 | 1 | 0 |
| $IV_3$ | 34 | 34 | 0 | 0 | 0 | 0 | 0 | 0 |
| $IV_4$ | 33 | 33 | 0 | 0 | 0 | 0 | 0 | 0 |
| $IV_5$ | 35 | 35 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 164 | 159 | 2 | 1 | 0 | 1 | 1 | 0 |

It will be observed that three third grade classes and one fourth grade class failed to secure 100% for all pupils. Class $III_2$ was hit by an epidemic of mumps and apparently was unable to overcome the handicap. No explanations can be offered for the other classes failing to make the grade. They apparently worked as hard and were as intensely interested as any other group. The intelligence ratings of two third and two fourth grades is given here,

| Pupils | 100% | 90-99 | 80-89 | 70-79 | 60-69 | 50-59 | 40-49 |
|---|---|---|---|---|---|---|---|
| III$^1$ | 36 | 36 | 0 | 0 | 0 | 0 | 0 |
| III$^2$ | 27 | 8 | 8 | 8 | 3 | 1 | 1 |
| III$^3$ | 32 | 30 | 1 | 1 | 0 | 0 | 0 |
| III$^4$ | 35 | 32 | 3 | 0 | 1 | 0 | 0 |
| III$^5$ | 30 | 30 | 0 | 0 | 0 | 0 | 0 |
| | 159 | 136 | 8 | 9 | 4 | 1 | 1 |
| IV$^1$ | 28 | 28 | 0 | 0 | 0 | 0 | 0 |
| IV$^2$ | 34 | 29 | 3 | 1 | 0 | 1 | 0 |
| IV$^3$ | 34 | 34 | 0 | 0 | 0 | 0 | 0 |
| IV$^4$ | 33 | 33 | 0 | 0 | 0 | 0 | 0 |
| IV$^5$ | 36 | 36 | 0 | 0 | 0 | 0 | 0 |
| | 165 | 160 | 3 | 1 | 0 | 1 | 0 |

that one may see that a high degree of intelligence, that is, above normal, is not a requisite to securing 100% accuracy.

| I.Q. | 140+ | 130+ | 120+ | 110+ | 100+ | 90+ | 80+ | 70+ | 60+ | 50+ |
|---|---|---|---|---|---|---|---|---|---|---|
| $III_1$ | 0 | 2 | 8 | 4 | 12 | 8 | 4 | 0 | 0 | 0 |
| $III_2$ | 2 | 0 | 2 | 5 | 8 | 7 | 4 | 1 | 1 | 0 |
| $IV_1$ | 0 | 0 | 0 | 4 | 4 | 12 | 6 | 2 | 0 | 0 |
| $IV_4$ | 0 | 0 | 3 | 4 | 11 | 6 | 8 | 0 | 1 | 0 |

Of the classes listed, a good and a poor third from the point of view of intelligence quotients, the better one secured 100%. In the case of the fourth grade classes, one of which is considerably superior to the other, both secured 100% in Addition. The other principals had departed for their summer work before the writer was able to secure from them a copy of the intelligence ratings for third and fourth grade classes. They had previously agreed at a principals' meeting, however, that intelligence was apparently not the controlling factor. Thus closed the first attempt in the state of New Jersey to secure 100% Accuracy in Addition.

The teachers and patrons were well pleased with the results obtained in Millburn. Naturally, the writer, being responsible for the attempt and the procedure followed, should have cause to feel likewise. His satisfaction, however, is not unadulterated. He doesn't <u>know</u> where these classes stand in the matter of subtraction, and is including the subtraction drill service for use in the fourth grade classes the next school year and diagnostic tests in subtraction for the pupils who have gone on from grade four. The fourth grade classes had satisfied their teachers in both subtraction and multiplication but so also in previous years had they done so in addition, before leaving grade three. Our tests disclosed that this

| I.Q. | 140+ | 130+ | 120+ | 110+ | 100+ | 90+ | 80+ | 70+ | 80+ | 90+ |
|---|---|---|---|---|---|---|---|---|---|---|
| III$^1$ | 0 | 5 | 8 | 4 | 12 | 8 | 4 | 0 | 0 | 0 |
| III$^2$ | 2 | 0 | 2 | 5 | 8 | 7 | 4 | 1 | 1 | 0 |
| IV$^1$ | 0 | 0 | 0 | 4 | 4 | 12 | 6 | 2 | 0 | 0 |
| IV$^4$ | 0 | 0 | 3 | 4 | 11 | 8 | 8 | 0 | 1 | 0 |

Of the classes listed, a good and a poor third from the point of view of intelligence quotients, the better one secured 100% in the case of the fourth grade classes, one of which is considerably superior to the other, both secured 100% in Addition. The other principals had departed for their summer work before the writer was able to secure from them a copy of the intelligence ratings for third and fourth grade classes. They had previously agreed at a principals' meeting, however, that intelligence was apparently not the controlling factor. Thus closed the first attempt in the state of New Jersey to secure 100% Accuracy in Addition.

The teachers and pupils were well pleased with the results obtained in Millburn. Naturally, the writer, being responsible for the attempt and the procedure followed, should have cause to feel likewise. His satisfaction, however, is not unadulterated. He doesn't know where these classes stand in the matter of subtraction, and is including the subtraction drill service for use in the fourth grade classes the next school year and diagnostic tests in subtraction for the pupils who have gone on from grade four. The fourth grade classes had satisfied their teachers in both subtraction and multiplication but so also in previous years had they done so in addition, before leaving grade three. Our tests disclosed that this

earlier satisfaction had no great foundation. Here is an example of the present conversation between principal and any of the teachers involved in the experiment.

Principal--"How do you feel in regard to the children's ability to do good work in arithmetic?"

Teacher--"Well, in subtraction and multiplication they are about up to the average, but say! this class certainly knows addition! I have never felt this way about any class before, but even though we failed to secure 100% with all the pupils, this class can add better than any class I have ever had. I learned a great deal, too, about organizing my material. Can't you get the 100% Drill Services in the other operations?"

The writer would like to have everyone of his teachers feel that way about each of the four fundamental operations in arithmetic. Next year he hopes to have 100% of all the third grade classes securing 100% in addition, and at least half ofthese same classes doing as well in subtraction. Two years from now he hopes to have 100% for all third grades in both addition and subtraction, and through having suitable material available, to begin to see results in all grades as a result of his efforts here. In three years, the school year 1931-32, he hopes to be able to demonstrate 100% Accuracy in the Fundamentals of Arithmetic. Is that program too ambitious?

In conclusion it might be stated that "It is possible to secure 100% Accuracy in Addition", because certain classes in certain schools have attained that distinction. It is probably likewise possible to do so in the other fundamental processes. In regard to the teaching of the 480 combinations given by Dr. Wilson, some require considerable more drill for some pupils than others do. Several points

were brought out in this work, among them were:--that accuracy in flash-card drill did not necessarily mean accuracy in written work; difficulty was experienced by many pupils because of lack of sufficient drill in horizontal addition with the smaller number first, as 3 + 5 = . This is given in the drill service in Group 2 and not again until Group 10 is dealt with. Single column addition of three numbers, and no zeros, sums less than 19 furnished further difficulty. For example, a pupil was confronted with the following situations, to which he responded as indicated.

| | | | | |
|---|---|---|---|---|
| 5 | 4 | 9 | 9 | 9 |
| 4 | 5 | 9 | 5 | 4 |
| 9 | 9 | 18 | 4 | 5 |
| | | | 17 | 17 |

Apparently adding an unexpressed "9" to a visible "9", is a different situation than adding two visible nines. In teaching next year, these points together with other benefits derived from experiencing our attempt, will be made use of, in our new drive. Appended is a sheet similar to those used by the teachers in reporting the progress of the experiment.

It is also hoped to secure Dr. Wilson's approval of making mimeographed copies of the "3P" tests in which the order is greatly varied. Three copies will be used each with a different order but the whole keeping the same examples. Thus it is hoped that we may remove all doubt about the reality of our results. Two copies will be used for diagnostic purposes, the original for final tests results and the third copy for ability to duplicate the results on the original test.

Finally I wish to express my appreciation of my superintendent for giving me authority to carry out this study, to thank the principals for their splendid cooperation, and the teachers for their

wonderful efforts. Especially do I extend credit to Miss Johnson, $III_1$, Washington School; Mrs. Lewis, $IV_4$, Washington School; Miss Taylor, $IV_1$, Washington School; Miss Hopkins, $III_2$, Washington School; and Miss Downing, $III_4$, Washington School. Without the cooperation, willingness, cheerfulness, and ability of this group, the experiment would have failed completely. As our system loses but one of the teachers mentioned, we promise better results for next year and thereafter.

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TEACHERS OF GRADES THREE AND FOUR

Please fill out the following report, on the FUNDAMENTALS OF ARITHMETIC. Leave blank if not given.

Date of first Presentation of Test 3 A ( )

Number wrongs 0-1-2-3-4-5-6-7-8-9-10-11-12-13-14-15-16

Number of Pupils

Date of reaching 100% with all pupils ( )

Date of first Presentation of Test 3 B ( )

Number wrongs 0-1-2-3-4-5-6-7-8-9-10-11-12-13-14-15-16-17

Number of Pupils

Date of reaching 100% with all pupils ( )

Date of first Presentation of Test 3 C ( )

Number wrongs 0-1-2-3-4-5-6-7-8-9-10-11-12-13-14-15-16

Number of Pupils

Date of reaching 100% with all pupils ( )

First Presentation of Test 3 D ( )

Number wrongs 0-1-2-3-4-5-6-7-8-9-10-11-12-13-14-15

Number of Pupils

Date of reaching 100% with all pupils ( )

First Presentation of Test 3 P ( )

Percents 91-100 81-90 71-80 61-70 51-60 41-50

Number of Pupils

Date of reaching 100% with all pupils ( )

Would you like mimeographed copies of any of these tests for drill purposes? Which ones?

# Handling Over-Aged Children

by
Walter E. Hammond
Principal, Washington School,
Millburn, New Jersey

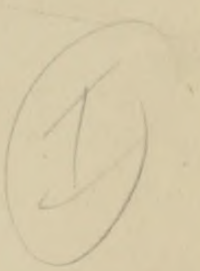


Table of Contents.

Outline.

Subject:- Handling Over-Aged Children.

Setting:- Washington School, Millburn, N. J., with 25.4% of the pupils retarded. Method of correction and prevention to be presented to the Supervising Principal, and then, with his approval, put into operation.

Method:- Determining the causes of retardation functioning in this particular school, and the extent to which each functioned. Devising a scheme to correct each, by consulting literatures on the subject, by consulting other school men, and by experimentation. The putting the scheme into operation and checking to determine its effectiveness.

Solution:-Promote from kindergarten on basis of mental age and teacher judgment. Abolish semi-annual promotions and establish two parallel classes for each grade. Group pupils in these classes according to their mental ability and achievement. Adapt the curriculum to meet the needs of these groups. Free the teachers from the restraint of a detailed course of study and develop a "child-centered" school. Abolish final examinations and utilize standard achievement and diagnostic tests in all school subjects. Provide an additional special class teacher to care for another special class of 15 mentally deficient pupils.

Result:- Retardation as expressed on paper, has been reduced from 25.4% to 8.6%, the actually lowering, however, being to 15.5%. The first condition is produced by placing all pupils to within 1 year of the proper grade for their chronological age. The second, or real improvement, is due to the fact that many of these pupils have covered the last work by an adaptation of a modified Dalton plan and have successfully done the work of the new grade.

# Handling Over-Aged Children.

My attention to the subject of over-aged children is due to the fact that an age-grade table for the Millburn Schools showed an over-age condition of some 15%. Analysis of these figures disclosed that one school was largely responsible, having 25.4% of its pupils misplaced according to their chronological ages. As I had but recently been appointed principal of this building, I made it my problem, to determine the cause or causes of this condition; to advance a scheme of organization to remedy the condition; to institute a policy which would prevent a recurrence. Having made the study, the findings are to be (have been) submitted to the supervising principal for his approval, along with the necessary information for him to properly bring the matter to the attention of the board for their consideration. (Approved and granted.)

In order to leave as few loose ends as possible, I have followed a given procedure, namely, offering various hypothetical causes, checking to determine the extent to which each was functioning, consulted various literatures bearing on the supposed cause, devising a method to effect a remedy in our particular situation, putting the method into operation and after a suitable interval of time, checking to determine its effectiveness in operation. Bearing in mind, then, this general mode of procedure, no attempt will be made to keep all of the sub-problems separated, but events will be rather chronologically arranged, new problems sometimes being discovered and settled during the process of solving another.

The Washington School of Millburn has an enrollment at the present time of 442 pupils, registered from the kindergarten through grade six, and includes, as well, a special class for pupils of low mentality. Including the kindergarteners, there is a staff of 15 experienced teachers. In addition, music, drawing, manual training, and physical education are provided with special supervisors. All of the rooms in the building are in use, although none are crowded. The entire school is equipped with movable furniture. Promotions in this one building are semi-annual, but elsewhere in the town, annual. Entrance to grade 1 B, from the kindergarten has been determined by the chronological age of the candidate, all pupils not more than two months under the age of six, being sent on. From the above conditions it is evident that many factors have entered to bring about a condition of over-ageness. Last but not least, is the fact that just 50% of the school is of Italian parentage, with a consequential language handicap.

The general causes of retardation which were investigated, were the following:

1- The general intellectual level of the school may be low.
2- The children may be of average intelligence but may be retarded by language difficulty.

3- Promotions have always been made from the kindergarten to first grade on the basis of chronological age, possibly resulting in interference with the development of certain children who have been subjected to first grade methods before they are competent to benefit by them.
4- This school is the only one in the system following the scheme of semi-annual promotions, therefore there is no place for the February High Sixth Grade to go to, except those brighter individuals who can skip the first part of the seventh grade work. This might result in the piling up of normal retarded children at whatever point the semi-annual promotions stopped.
5- The curriculum of the school may be improperly adjusted to the capacity of children to learn, permitting only those of more than average intelligence to satisfactorily complete the work.
6- The teaching staff may be of poorly equipped training, experience and ability, to do a good job.
7- Supervision may have been neglected or been of poor quality, resulting in inferior work on the part of teachers capable of doing better.
8- Equipment provided may be meager, and the disposition of the School Board may be such as prohibits the use of the best methods of educational procedure.
9- Over-age pupils may be those who have received most of their training in an institution with a lower standard.
10- Over-age pupils may be those who have lost time in attendance because of illness, or whose ability has been interfered with by poor general health.

The above hypothetical causes will be considered in the above order.

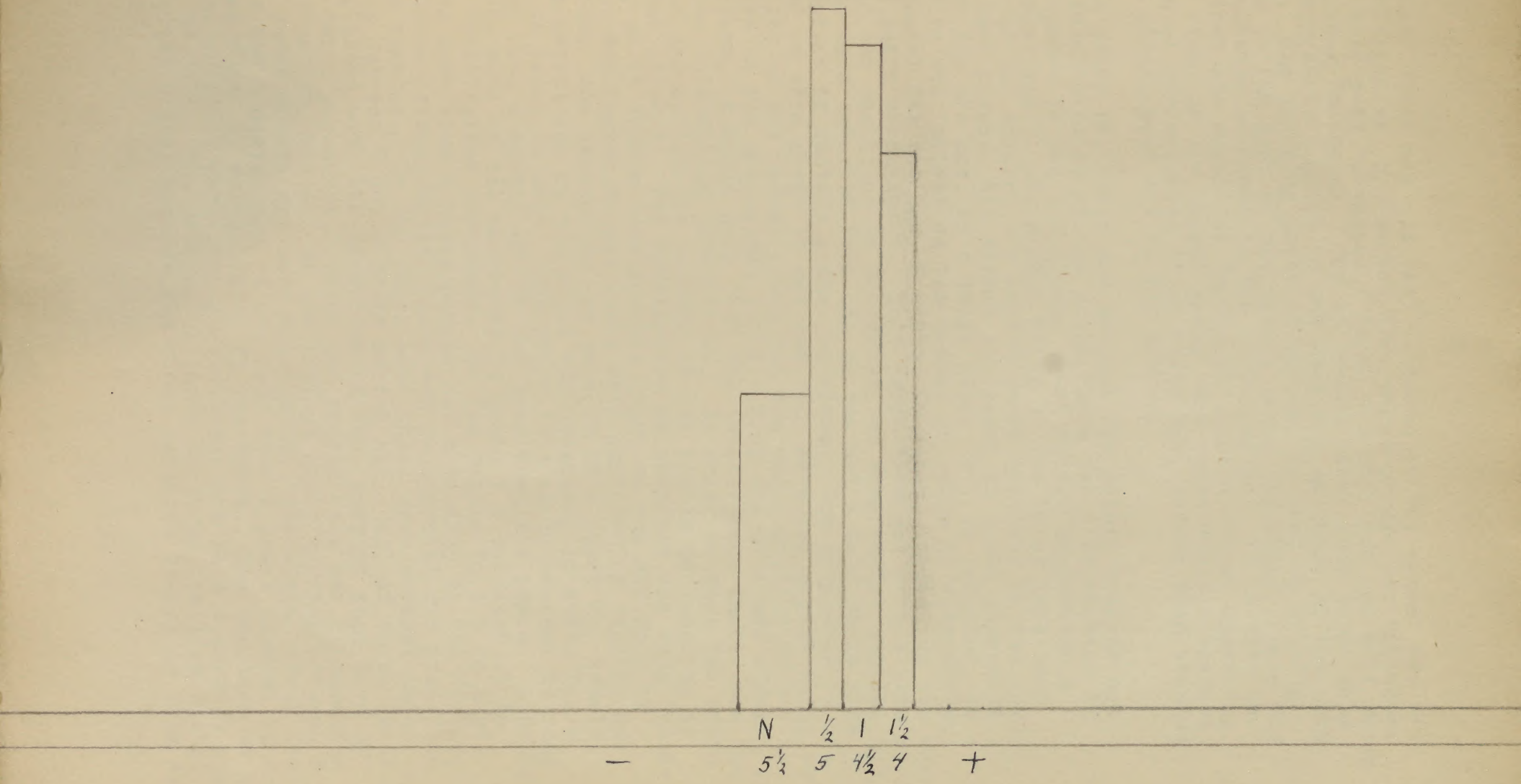
1- The general intelligence level of the school group may be low.

In order to answer this question, the Otis Intermediate S. A. Mental Tests were given in the fifth and sixth grades, the Otis Primary Mental Tests in grades three and four, and the Pintuer Cunningham Mental Tests in the kindergarten, first and second grades. Then, to make clear the situation in this school, the extent of retardation has been illustrated graphically for each class and for the school as a whole. Graphs have likewise been prepared from the data obtained from the intelligence tests, a graph for each class, and one for the school as a whole. It became at once apparent that a third graph was necessary which would indicate to what extent the particular pupils of low intelligence were retarded, those of high intelligence advanced, and those of normal intelligence in the proper grade.

The first graph to be considered is #1, showing the condition of retardation in the kindergarten during the first half year, 1928-29. Not much can be said about it. Children may enter at the age of four, and have always been promoted if within two months of six years of age in September or in February. The graph therefore shows no pupils over the age of

# Retardation Graph — Kindergarten – 12/28/28

(opp. page 5.)



six years. Five and one half is taken as the normal age for the kindergarten, pupils but five years of age are indicated as one half year "advanced," those but four and one half years as one year "advanced," for no reason other than to be able to interpret this graph in the same way as those of the other grades. The striking point of course, is that as nothing appears to the left of the normal group (in blue), there are no retardates recorded in the kindergarten. It is also obvious that the number of "advanced" pupils, those appearing at the right of the normal group, are there wholely because they enter kindergarten at an early age, rather than because of any advancement due to the school.

In graph #2, there are several new points brought out. The general outline of the graph shows the distribution of intelligence in the 1 B class. Each square represents a particular pupil, his number being in the upper left hand corner of the square; his intelligence quotient in the upper right hand corner; his status in regard to grade placement if correct for his age, by a large black "N"; if retarded, by a number in red indicating the number of years of retardation; if advanced for his age, a number in black, indicating the number of years advancement. This graph does not give a true picture of the condition in September, as some twelve pupils, all of whom were retarded from one to two and a half years were transferred to another grade, or class. The situation as indicated on this graph is not bad, all advanced pupils being on the right of the normal group and the major portion of the retardates in the sub-normal group. From the evidence offered by this class, it would seem that the intelligence factor was the main one determining retardation. In order to test the truth of this assumption the success of the pupils in learning to read was checked. The information so obtained was very interesting as it throws considerable light on the efficacy of Pintuer Cunningham Mental Tests with children of Italian extraction. One assumption was made in this check up, namely, that a mental age of six years was necessary in order for a child to learn to read. Therefore if a child learned to read he must have a mental age of not less than six years. A study was then made of the successes in grade 1 B in relation to their intelligence quotients. Of the pupils in 1 B no pupil testing less than 5 years mental age according to the Pintuer Cunningham Primary Mental Tests was recommended for promotion by the teacher. On the other hand there were several children testing between 5 and 6 years mental age. All of these children were Italian with the exception of two, both of whom were of Anglo-Saxon parentage. These two pupils were not recommended for promotion, but all of the Italian group testing between 5 and 6 years mental age were successful. Therefore, these Italian pupils had a mental age of not less than 6 years instead of one between 5 and 6, as indicated by the tests. The families of the Italian children were then investigated and this situation was found to hold. The younger children of large families tested apparently higher because the older children talked to them in English.

# 1 B 12/28/28.

#2 3A

| | | 60-69 | 70-79 | 80-89 | 90-99 | 100-109 | 110-119 | 120-129 | 130-139 | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Katherine De Fino | | | | | 32 1/2 104 | | | | 22 Nelson Rockefeller |
| 2 | Peter DElia | | | | | | | | | 23 Marie Cianci |
| 3 | Frank Terracino | | | | 24 N 99 | 31 1/2 102 | | | | 24 Lena Macio |
| 4 | Esther De Bliss | | | | | | | | | 25 James Patterson |
| 5 | Vito Marcantonio | | | | 20 N 96 | 30 N 109 | | | | 26 Mildred Roff |
| 6 | Bridget Pace | | | | | | | | | 27 Rocco Lamartino |
| 7 | Redmond Duncheon | | | | 17 1/2 90 | 29 N 105 | | | | 28 Fred Heinemeier |
| 8 | Elsie Monahan | | | | | | | | | 29 Gloria Marella |
| 9 | Geo. Heinemeier | | | 21 1 89 | 16 N 97 | 28 N 103 | 38 1/2 110 | | | 30 Lloyd Smith |
| 10 | Charles Sutton | | | | | | | | | 31 Sam'l Rose |
| 11 | Vita Strone | | | 11 1/2 85 | 15 N 94 | 27 N 108 | 37 N 118 | | | 32 John Skelly |
| 12 | Anthony Passarelli | | | | | | | | | 33 Harvey Tiger |
| 13 | Rose Degliemo | | 18 1/2 79 | 9 N 86 | 14 N 95 | 26 1/2 107 | 36 N 113 | | | 34 Michael Di Giovanno |
| 14 | Theresa Tobue | | | | | | | | | 35 Alma Sherry |
| 15 | Carmen Paonessa | | 5 N 76 | 8 N 89 | 13 N 93 | 23 N 101 | 34 N 110 | | | 36 Richard Philp |
| 16 | Frances Caivano | | | | | | | | | 37 Romayn Hammond |
| 17 | Marie La Manna | 3 1/2 67 | 4 N 74 | 7 N 83 | 12 N 90 | 22 N 100 | 33 N 112 | | 40 N 135 | 38 Jane Lyon |
| 18 | Mary Grassi | | | | | | | | | 39 Jean Burd |
| 19 | Robert Thompson | 1 N 65 | 2 N 70 | 6 N 81 | 10 N 91 | 19 1/2 101 | 25 1/2 110 | 35 1/2 121 | 39 1/2 130 | 40 John Hermer |
| 20 | Anna Gallitelli | | | | | | | | | 41 |
| 21 | Edward Lee | | | | | | | | | 42 |

The above graph shows the distribution of intelligence in 1 B. It will be observed that it is a fairly normal distribution. Each square indicates a particular pupil, the small number in the upper left hand corner is the pupil's number, the intelligence quotient is in the upper right hand corner. Retarded pupils are in red, the large fraction indicating the years retarded. "N" indicates the pupil is in the right grade for his age, a large figure in black, indicates the years advanced for his age.

#3 3B

1 B adjusted graph. 12/28/29

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | 24 N 99 | 32 1/2 104 | | | |
| | | | | 20 N 96 | 31 1/2 102 | | | |
| | | | | 16 N 97 | 30 N 109 | | | |
| | | | | 14 N 95 | 28 N 103 | | | |
| | | | | 13 N 93 | 27 N 108 | 38 1/2 110 | | |
| | | | 21 1 89 | 12 N 90 | 27 N 107 | 37 N 113 | | |
| | | | 18 1 1/2 86 | 10 N 91 | 26 1/2 107 | 36 N 113 | | |
| | | 3 1/2 74 | 6 N 88 | 9 N 93 | 23 N 101 | 34 N 110 | | |
| | | 2 N 77 | 5 N 83 | 8 N 95 | 22 N 100 | 33 N 112 | | 40 N 135 |
| | | 1 N 72 | 4 N 81 | 7 N 90 | 19 1/2 101 | 25 1/2 110 | 35 1/2 121 | 39 1/2 130 |
| | 60-69 | 70-79 | 80-89 | 90-99 | 100-109 | 110-119 | 120-129 | 130-139 |

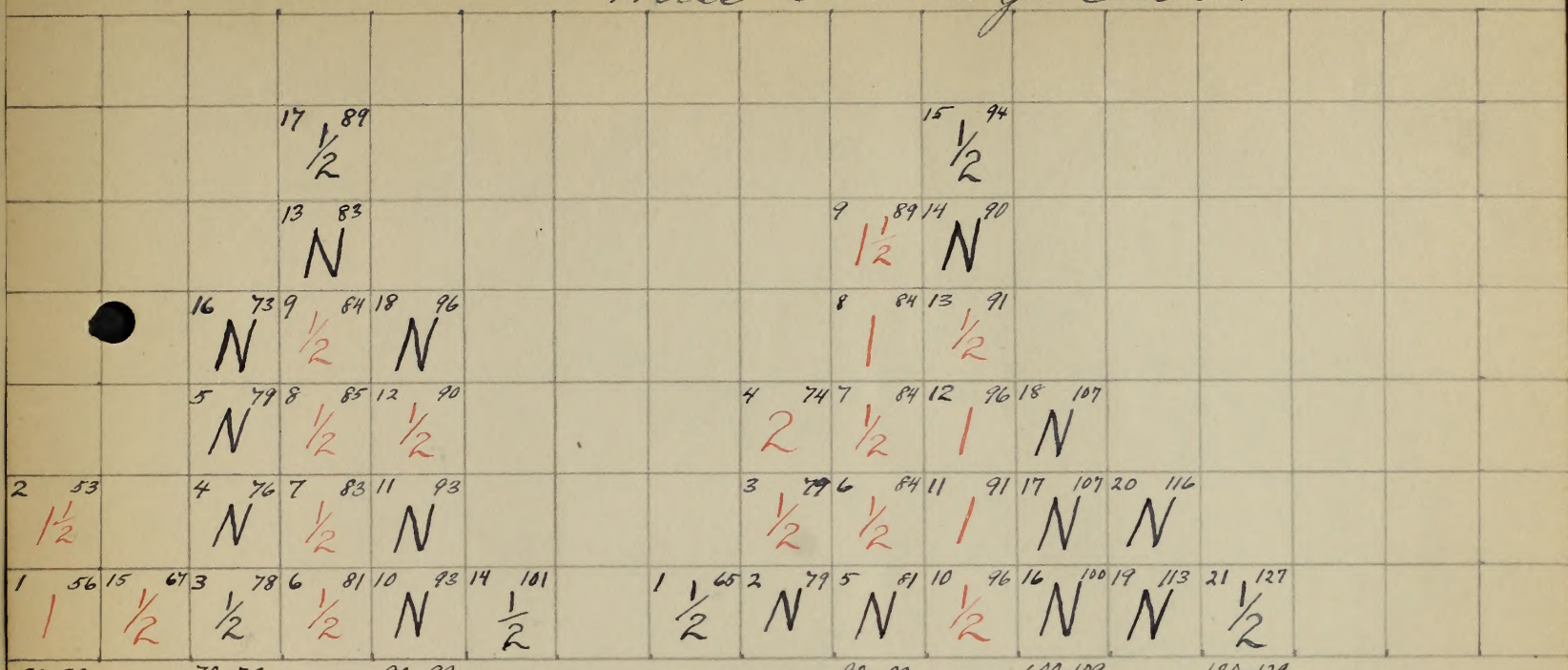
This graph is very similar to #2, but readjustments have been made for the lowering of intelligence quotients by language handicaps. It does change the aspect of the situation completely in an important aspect. In graph #2, 50% of the retarded children rate as sub-normal, while in graph #3, but ~~26~~ 37 1/2% of the retarded cases are so recorded.

With small families, children near the same age received but little help in this direction, while only children were seriously handicapped. In the Italian homes, the father usually learns English, the mother more rarely, the father and mother converse in Italian, and usually address the children in Italian, which language the children learn to understand but not to speak. The mother learns to understand spoken English, but not to speak it. This point might well be considered by foreign language teachers. Each part of language learning is apparently specific.

Returning to the case of the Italian children in our school, their language handicap is a more serious drawback in their ability to make a true rating on the mental tests used, than it is in their ability to learn to read. Promotions from kindergarten to 1 B cannot be based entirely on the ability of the pupils to score a mental age of six years, unless adjustments are made covering the situation so that Italian children who secure a mental age of 5 years may be promoted if their chronological age is within two months of six. The law in the State of New Jersey permits children to remain in the kindergarten up to the chronological age of seven years. This scheme was followed for the February promotions and from the present indications there will be no failures in grade 1 B.

There were, in grade 1 B, several children who entered in years past that were not learning successfully. Twenty-three pupils were in this group. A separate division was made of this group and the principal of the building worked with it for a period of two months, for one hour each morning and afternoon, with the result that thirteen were moved into the regular group where they are progressing nicely and ten were returned to the kindergarten where they still continue to get special treatment designed to break down habits built up by having been sent on to grade one before they were mentally capable of doing the work. The treatment is working out even more satisfactorily than had been hoped for. Thus a situation that has been producing a condition of retardation in the lowest grades has been removed. The findings here require a readjustment of the graph for grade 1 B and that is provided on graph sheet number 3. The readjustment did not effect the normal or superior group to any great extent except as the normal group was made larger. According to graph #2, approximately 50% of the pupils fall into the normal group, about 20% in the superior group and 30% in the inferior class. In graph #3, 59% of the pupils rate normal, 21% superior and 20% inferior, a very frequent distribution. Of more import is the fact that on Graph #2, 50% of the retardates rate sub-normal, while on graph #3, but 37½% of the cases are so rated. Another important point is that 50% of the retardates are Italian. Without stressing the point any further, graphs of the remaining classes of the school are presented, and finally, the graph for the school as a whole. Considering the fact that the graphs for the school as a whole, are not "adjusted" graphs, it is very evident that retardation in the school is not due to a general state of low intelligence.

# Miss Downing's Class.




50-59 60-69 70-79 80-89 90-99 100-109

60-69 70-79 80-89 90-99 100-109 110-119 120-129 130-139

## 1-B- Pupils.

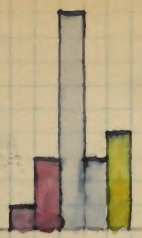
1- Frederick Rizzo.
2- Frank De Rino.-
3- Victor Principal. - returned to K.
4- Eugene Gerardello - sent to R 1.
5- Fannie Mauterino. - sent to R 1
6- John Mc Keever - sent to R 1.
7- Anna Marcantonio - died
8- Josephine Lwiteck - sent to R. 1
9- Harold Garrabrant
10- Lewis Mc Keever
11- Carl Klinger - sent to R. 1.
12- Christine Mac Pherson
13- Raymond Funcheon
14- Robert Thompson
15- Frank Ferracino
16- Esther De Bliss
17. Elsie Monahan
18. Anna Gallitelli.

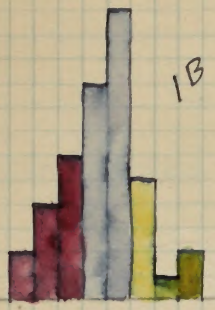
## 1-A- Pupils.

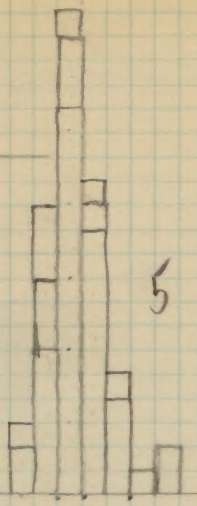
1- Ellen Carello. - returned to K.
2- Raphael Mancione - P?
3- Anthony Caivano - P
4- Fred Hummer - P
5- Anna Clameo - P?
6- Irene Grant - P
7- Anthony Pesio - P
8- Mary Reed - P
9- Douglas Gobie - P
10- Matthew Reino - P
11- Henrietta Lemke - PP?
12- Sam Caivano - PP?
13- Thomas Palmieri - P
14- Constantine Saloggo - P
15- David Barton - P?
16- Lawrence Lytera - P
17- Jewel Zuba - P
18- Lillian Young - P
19- William Krum - P
20- Benjamin Heller - left, ill.
21- Eleanor Guenther. - P

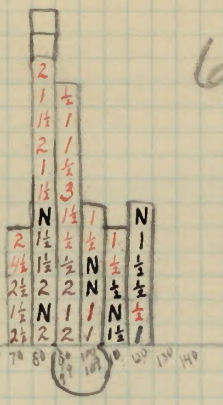
Sheet #5

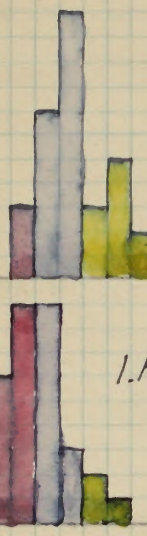
# Intelligence Distribution in each class.

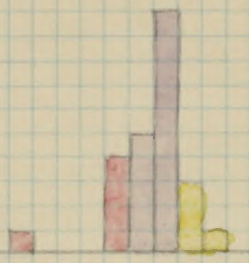


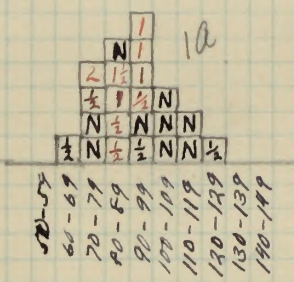



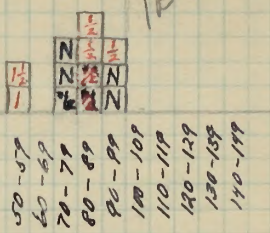




#5



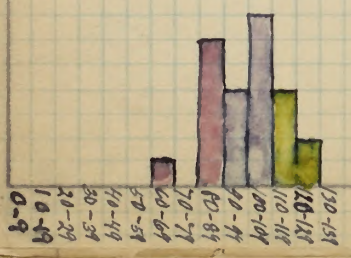




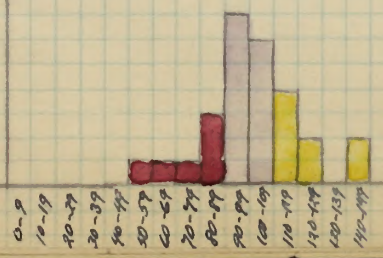




1.Q.s.

4B.

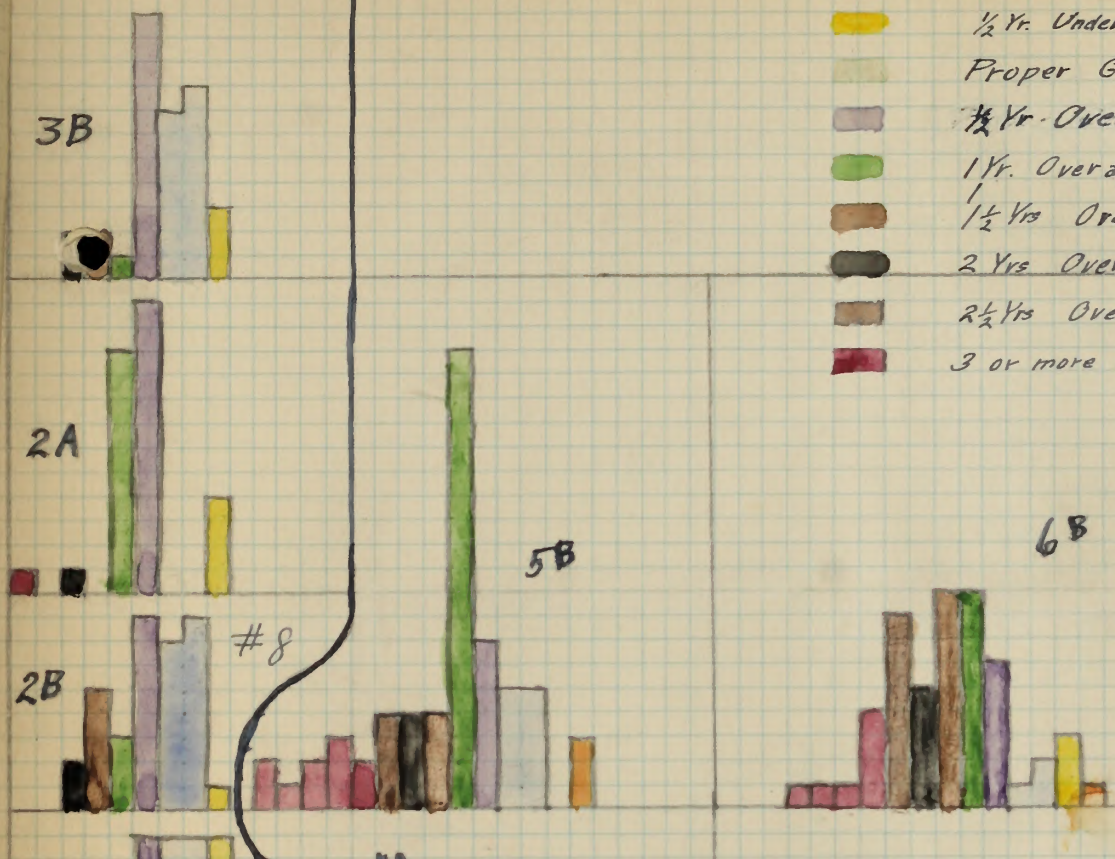



2A.



Sheet #6

4C



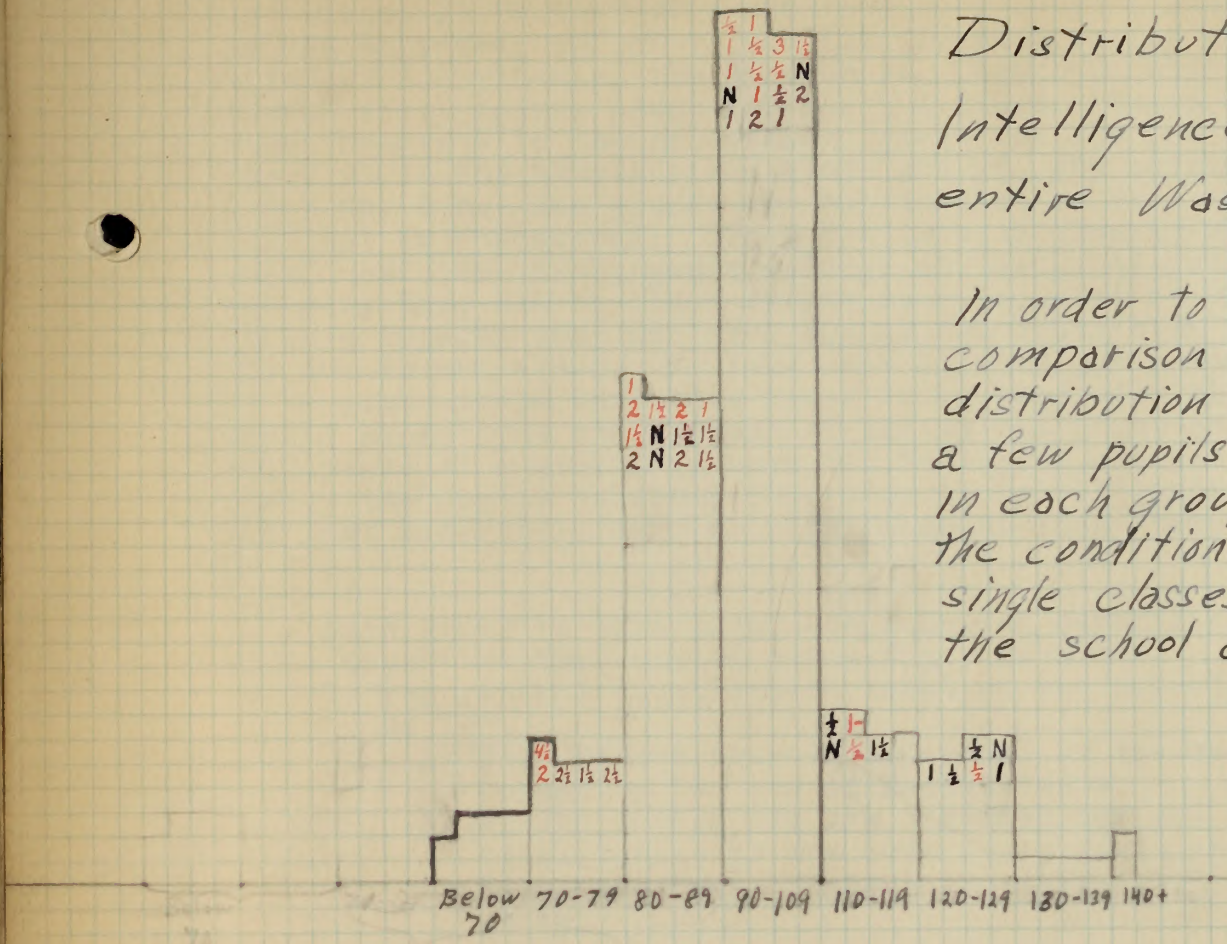

Retardation Distribution in each class.

to 4 4.7 5.1 5.7 6.1 6.7 7.1 7.7 8.1 8.7 9.1 9.7 10.1 10.7 11.1 11.7 12.1 12.7 13.1 13.7 14.1 14.7 15.1 15.7 16.1 16.7 17.1 17.7 18.1
4.6 5 5.6 6 6.6 7 7.6 8 8.6 9 9.6 10 10.6 11 11.6 12 12.6 13 13.6 14 14.6 15 15.6 16 16.6 17 17.6 18 18.6

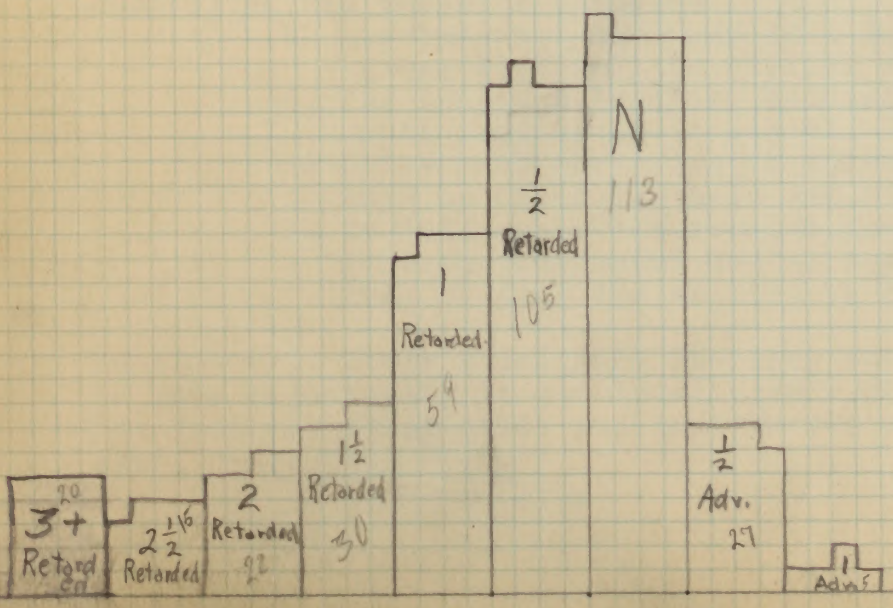
Sheet #7. 4E

# Distribution of Intelligences for the entire Washington School.

In order to facilitate comparison with the distribution of retardates, a few pupils are indicated in each group to show that the condition observed for single classes maintains for the school as a whole.




Distribution of pupils as retardates. 4F



Graph #4 is that of a combination 1 B and 1 A grade. It is not adjusted, and shows the intelligence rating and retardation by individuals, the same as #3. Graph #5 shows an unadjusted intelligence graph for the 1 A class. Graph #6 on sheet number 6 is the retardation graph for the 1 A class. Graph #7 is the intelligence graph and #8, the retardation graph for 2 B. The graphs are all labeled so the remainder will not be enumerated. The point is very clearly shown, however, that the intelligence ratings of the pupils are not abnormally low, and by class graphs (not included or submitted in this report) that not over 40% of the retardates fall in the sub-normal class. To take care of this group and not cause it to grow, steps have been taken to do away with the semi-annual promotions and instead of having the first and second half-years of a grade, to have two full year classes for each grade, the pupils selected according to intelligence quotients and past successes, and the curriculum of each group adapted to it.

This study to this point has answered several of the possible questions that needed answering. To wit:-

1- The general intellectual level of the school group may be low.
   - A- This is not true as evidenced by the results obtained by the use of mental tests.
   - B- Of the pupils who are retarded but 40% show low intelligence by the Otis Group Tests used.
   - C- Retardates were present in every intelligence group.

Conclusion:- While low intelligence is the highest rated cause of retardation it is not this factor alone. Forty per cent of the retardates have a low intelligence rating, but it is equally true that many pupils of equally low intelligence are normal in progress as indicated by their placement.

2- The children may be of average intelligence but may be retarded by language difficulty.

The present investigation brings out the following points bearing on the second hypothesis.

- A- The language handicap is a functioning cause, but rather difficult to express on a percentage basis.
- B- The language handicap becomes less and less as the pupil progresses in school.
- C- It is most serious with those foreign children who have no older brothers and sisters.
- D- It influences the results from the use of the Pintuer-Cunningham Mental Tests more detrimentally than it does the ability to read.

Conclusion:- Where a language handicap exists, it is necessary to make adjustments in the intelligence ratings, so as not to bar from the first grade pupils with the ability to learn to read.

3- Promotions have always been made from the kindergarten to first grade on the basis of chronological age.
   A- To rely on chronological age alone as a determiner of fitness to enter grade one, results in retardation of those pupils lacking the ability to learn to read, by the acquisition of habits which interfere with the learning-to-read process.

Conclusions:- Promotions to first grade should be made on the basis of chronological age plus the results of an intelligence test plus the judgment of the kindergarten teacher. A slow, first grade should be provided for those pupils possessing a mental age of six years but an intelligence quotient of less than 90 (possibly 100.)

4- Semi-annual promotions.
   A- Since semi-annual promotions are not provided for, in those schools receiving pupils from our sixth grades, a system of annual promotions should be adopted to prevent the retardation of the sixth grade pupils.
   B- The change from the semi-annual promotion scheme to an annual promotion scheme can be utilized to reorganize the classes on the basis of ability, thus forming February "B", or beginning grade classes, of pupils with sufficient ability to do the entire year's work in one half year. This scheme has been put into operation and at present semi-annual promotions do not occur above grade three. At least one more entire year will have to be used in making the shift and entirely eliminating promotion by half grades.

5- The curriculum of the school may be improperly adjusted to the capacity and ability of children to learn, permitting only those of more than average intelligence to satisfactorily complete the work.

In investigating this suggestion as a possible cause of retardation, teachers' marks were correlated with intelligence ratings, month by month. The very interesting situation was observed that this correlation fell off month after month, when one might expect the reverse. The following appears to be the explanation. When the pupils are first with the teacher, they are more or less unknown to her, so she rates them for what they actually attain, teaching them as a unit. As time goes on she gives more and more attention to the backward ones and the brighter ones not being pushed, drop behind. She is constantly aiming to form a homogeneous group as regards actual acquisition of knowledges rather than teaching them according to their ability to learn. The cause of the teacher adopting this attitude appears to be the existence of a detailed course of study, specifying how much material should be taught and what material. The course of study had not been revised for many years and called for many features now looked upon as unsound. Arithmetic

and spelling were formal subjects in 1 A and stressed in the second grade. Number was not presented concretely and the method of teaching reading was prescribed. A history book recommended by the State Department as a reference work for fourth grade teachers had been adopted as a text for the pupils. No nature study was required. All in all, the course was doing more harm than good. The following recommendations were made.

A- Lock the course of study up in a drawer and leave it there.
B- Acquaint the pupil with concrete number and number situations only in grades one and two, beginning formal addition in grade three, in which grade an attempt would be made to secure 100% accuracy according to the Wilson Tests. This effort is apparently going to be successful.
C- Use diagnostic tests in all subjects to find the specific difficulties and then use the findings for specific teaching.
D- Teach the pupils in groups, according to their needs and abilities.
E- This change will result in having the curriculum fit the child rather than the farce of attempting to have the child fit the curriculum, with the attendant retardation.

6- The teaching staff may be poorly equipped by training, experience and ability to do a good job.
   A- This is not true to fact. All are experienced and well-trained.
   B- Practically every teacher has felt repressed and "standardized." This situation has been relieved by "junking" the course of study and by giving the teachers "free rein" to teach, holding them accountable for teaching material with an educational value and for getting such material as is selected, "across" by such methods, devices, etc., as their own ingenuity and study, can devise.

7- Supervision may have been neglected or been of poor quality, resulting in inferior work on the part of teachers capable of doing better.
   A- The preceding principal had this school and one other, nearly a mile away, under his charge. He was never present at this building in the afternoons unless sent for, which was frequent, for discipline troubles were many. The fault was neither his nor that of the supervising principal. Millburn has nearly doubled its population within the past five years and more attention has been given to a building program than to the administration of the system. When the present supervising principal first accepted his position here, the system was so small, that he personally supervised all promotions, demotions, took care of discipline cases, served as attendance officer and many other duties usually referred to another official in a larger system. The system grew and the supervising principal has tried to keep himself as closely in touch with affairs as in the past by retaining the above duties for himself. A principal

was not free to effect desirable changes in his school. There still remains a strong feeling for "uniformity" in the system, such as keeping classes in different schools at approximately the same place in the various subjects, etc.

B- Much has been made of annual exhibits of school-work, such as a physical education exhibit, an evening affair at which teachers taught their classes and the school building was decorated with examples of the pupils' work in the various subjects, "art" being particularly prominent. If these affairs functioned as normal events, rather than special affairs, they would have been a direct asset. As it was, the major portion of the school-day for a month or more preceding each exhibit was spent in "preparing" for that particular event. Programs were neglected and subjects omitted. The physical education exhibit was a double affair. The first was on a competitive basis. Selected classes from the various schools, "competed" before disinterested judges. The school having the largest number of winning classes was adjudged the victor. A great deal of feeling developed among the teachers. Teachers of those classes that "lost" from each school were held responsible by the winning class teachers from each building, for the "loss" of the victory in the whole event. Usually those teachers whose classes did lose, were the most conscientious in regard to their other class work. Praise for the winning teachers--interpreted as censure by and for the losing ones--usually came down from "on high." It can readily be seen that under these circumstances only the brighter pupils would succeed in meeting the minimum requirements set for promotion to the next grade.

A similar situation existed in regard to the exhibit of class-room work. This developed to a mere display of large amounts of material in its completed form, almost all of which would have formed the basis for some excellent projects, but instead, were constructed during the month preceding the exhibit, by devoting entire days to their manufacture and none to their study. It was a fine exhibition of what might have been good teaching but really represented mere display.

C- The situation is somewhat better now, although the school principal is at a decided disadvantage when the supervising principal will accept such conditions. The teachers naturally desire his praise more than they fear your censure.

Conclusion:- The exhibitions should continue to be a part of the school program, but the physical exhibition work will be wholly an exhibition and not a competition. No work shall be exhibited except such as has been used during the school year up to the time of the exhibition and no special time shall be devoted to its preparation. Teachers and pupils shall not be aware of the

drills, etc., used during the year, that they will be called for to demonstrate the work of the year, until the day of the exhibit.

In regard to the exhibition of class-room work, all work on exhibition shall be dated and checked by the daily plans of the class-room teacher. Manufactured materials must be the result of actual project work and principals must see that no more time is devoted to a given subject on the daily class-room program than is its rightful share.

Principals shall be held responsible for the results obtained from the teaching in their buildings, and shall be given the necessary authority and support to make it possible for them to prevent a recurrence of such conditions as held in the past.

8- Equipment provided may be meager, and the disposition of the School Board may be such as prohibits the use of the best methods of educational procedure.
A- Equipment for all of the schools in Millburn is of the best, and there is no tendency to deny any of the most modern means of carrying on a school.

Conclusion:- Inasmuch as this seems to have been a prevailing attitude, such needs as the schools have, are a result of non-recognition, or failure on the part of those desiring new materials to have thought through their plan of action requiring the use of such materials, sufficiently well to be able to give a convincing statement of its necessity in their program of work. It is still necessary for the teacher to discuss such matters with the supervising principal, although it is becoming evident that in the very near future, principals will "O.K." any order from his school and be held responsible for an improvement in teaching techniques and pupil learning as a result of such acquisition.

9- Over-age pupils may be those who have received most of their training in an institution with a lower standard.
A- Investigation of this situation gave the interesting information that 31% of the retardates were members of what might be called a floating population. This figure is arrived at by eliminating all of the pupils who could be rated as of low mentality even though many of those were recorded as members of several schools during their school life. There is no particular evidence of the schools they attended prior to entering ours, as having a lower standard. Most of them were retarded in the last school attended. Evidence seems to point to a lack of stability on their part, a feeling of "what does it matter" as "we go somewhere else from here."

Conclusion:- Where pupils in this group warrant it by possessing sufficient native intelligence, they have been placed in classes as close to their chronological age as possible. It is true they constitute a problem there, but much success is attending

our efforts in handling these children by a somewhat modified Dalton plan. We have many examples of pupils who have made the grade as a result of this individualized work and a few have demonstrated the ability to do superior work to the others in the group and out-rank the members of a class in which at one time they stood at the bottom of the list. This one change in administrating the school has resulted in the greatest lowering of the over-aged condition.

10- Over-aged pupils may be those who have lost time in attendance because of illness.

Fifteen percent of the retardates, eliminating those whose cause of retardation was given as low mentality, or frequent moving, show a high record of time lost due to illness, or while not actually losing time show a poor record of general health. We have helped some, those that are behind because of time lost, are being handled similarly to the "floaters" or those with a record of frequent movings. Such pupils are responding fairly well. Pupils with poor general health are not being hastened, nor pushed. Through the health clinic efforts are being made to build them up, but to the present time this has had little apparent effect in reducing the number of retarded pupils.

The Special Class, handling children who are mentally deficient, has played an important part in reducing the total of retarded pupils. For purposes of reporting this investigation, a pupil is considered retarded only when he has sufficient mentality to do satisfactory school work in advance of the grade in which he should be located for his chronological age. Thus, pupils of low mentality are considered retardates only up to the time that they reach their limit of acquiring academic learning. This is usually determined according to the following scale:-

| mental age | grade | chronological age for 80 I.Q. |
|---|---|---|
| 6 | 1 | 7.50 |
| 7 | 2 | 8.75 |
| 8 | 3 | 10.00 |
| 9 | 4 | 11.25 |
| 10 | 5 | 12.50 |
| 11 | 6 | 13.75 |
| 12 | 7 | 15.00 |
| | etc. | |

Now assuming a child of 10 years, chronological age, with an intelligence quotient of 80 and a mental age of eight years. This pupil would probably be found in grade 3 and doing a poor grade of work. The reason for this is that there appears to be a qualitative difference in brains, as well as a quantitative one, and for that reason, of two children of the same mental age, the one with the higher intelligence quotient will usually be found doing the superior work. Most psychologists accept 16 years as adult maturity although there is a strong inclination to lower it to 14. Thus, we can predict a "ceiling" for our particular pupil with the 80 I.Q. He will have a final

mental age of approximately 12 years, making it possible for him to do mediocre work in grade 7 by the time he has reached the age of 16. This assumption is based on Dr. Freeman's belief that the quality of work done by similarly mental aged individuals is equivalent. In a study made under Dr. Freeman's direction some four years ago, the writer did not find this to be true, nevertheless it is still accepted as a working basis pending further investigation. Such a child would be considered retarded throughout his school career in a school such as is being reported. On the other hand pupils with intelligence quotients below 80 would have reached their "ceiling" prior to leaving this building, in other words their limit of ability would be below the sixth grade level. Pupils frequently get "pushed" ahead in order to be rid of them and frequently one is stationed in the grade to which his ability limits him long before he has developed the real ability to be there on merit. Such pupils usually become problem cases.

The State law warrants the establishment of special classes to which children who are 3 or more years retarded may be sent. In Millburn, this law has been interpreted in the past as meaning a child must be in a grade 3 years behind the one he should be in according to his chronological age. Pupils have thus been kept in grade 1 until they were old enough to be in grade 4. No attention has been paid to the mental retardation of such pupils. As the Special Class held its quota of 15 pupils at the opening of school in September, and as there is no unoccupied room in the building that might care for a second Special Class, the problem of caring for additional special children has been difficult. The following provision has been made, however. As all of the present Special Class pupils are boys, they have been assigned to a large amount of manual training work, in the shop and under the direction of a manual training instructor who understands this type. At these periods, amounting to 10 hours in a 25-hour week, pupils needing special treatment are sent from the class-rooms to the special class teacher for special training. Some are generally defective, others with speech defects and other special defects. If the results warrant it, a second special teacher will be employed, both teachers, alternating between the gymnasium, manual training shop, and class-room. As soon as this is done 15 retarded pupils will be removed from the regular class-room registers and the number of pupils rated as retarded will be lowered.

Final Conclusions:- In order to reduce and control retardation in the Washington School, Millburn, N. J.,

A- children are to be promoted from the kindergarten on the basis of mental age and teacher judgment.
B- semi-annual promotions are to be gradually eliminated.
C- a scheme of parallel classes is to be instituted.
D- as there will be two classes for each grade, children will be grouped as far as possible according to ability and achievement.
E- the curriculum for each group will be adapted to its ability so that all pupils will be promoted annually.
F- a revision of the entire present curriculum will be undertaken to remedy its defects and bring it up to date.

G- another special teacher will be provided to care for another group of 15 deficient pupils.

H- the methods used by the teachers in their class-room work will take into consideration the present tendency to apply Dr. John Dewey's philosophy of education and such teachers as demonstrate the ability to "carry on" will be given marked freedom in their efforts to teach the children.

I- final examinations, now in use in grades 4, 5, and 6, will be eliminated and pupils will be tested regularly throughout the school-year with standard achievement tests, and diagnostic tests in all of their subjects. Promotion will then be based on the evidence given in these tests that their progress has been satisfactory.

J- the class-libraries, now numbering 35 volumes each, will be increased by 15 additional volumes, suited to the tastes and interests of the children who are to use them.

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